NOTE ON THE PATHOLOGY OF SUBLUXATION OF THE HEAD OF THE RADIUS IN CHILDREN.

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IN THE article on "Subluxation of the Head of the Radius in Children," by Dr. W. W. Van Arsdale, in the ANNALS OF SURGERY, for June, 1889, a reference is made to some experimental work of my own, which, I think, is misleading. Since I was unavoidably prevented from discussing the paper at the time it was presented before the Surgical Section of the New York Academy of Medicine, I venture to submit the following comments through the ANNALS OF SURGERY.

Dr. Van Arsdale's citation of my paper implies that I supported the view that the lesion consisted in an interposition of the capsular ligament between the joint surfaces. As a matter of fact, my experiments demonstrated to my own satisfaction that a more or less complete dragging out of the head of the radius from within the annular ligament occurred, with some stretching or laceration of the capsular ligament. This latter explanation is, I believe, that which is most generally accepted. The Doctor objects to it that it depends for support on experiments on the cadaver, in which the element of muscular tonus and active resistance does not occur. (2) That no observable ecchymosis is observed clinically in these cases, such as ought to result from laceration of the joint capsule. (3) That the snap heard in cadaver experiments is of a different character from that felt during examination of the injured children. "It is of softer quality, and the resistance to supination is not so well marked"

He inclines to accept the theory that some local injury of the head of the radius within the joint capsule, such as a partial solution of the epiphysis of the radius, occurs, produced by the lateral jerk of the biceps when the child catches at the nurse's hand to save itself from falling. "After replacement, the head of the radius is held in position by the muscular tonus, which causes the capitellum of the humerus to press down upon it." "There is no tendency to displacement, unless the accident is repeated." "The mechanical resistance to supination may be explained by the excentric configuration of the head of the radius, the epiphysis pushed partly to one side, impinges upon the ulna, until forced supination overcomes the resistance and reduction is accomplished at the same time."

The excentric configuration does not in any way interfere with the movements of the normal joint. I cannot conceive how the releasing of the smooth head of the radius from its supposed impingement against the ulna can cause the sharp snap that accompanies reduction, or how impingement of the head of the radius against the ulna can be produced by jerking the arm downward, or the jerking of the radius forward by the biceps. The biceps would have to act by jerking the head of the radius against the head of the annular ligament. If it can produce a "partial solution of the head of the radius" by so doing, it ought sometimes to produce a total separation, an accident which would obviously be a very grave one, giving rise to permanent disability to the joint. If the biceps had produced a sufficient lesion of the epyphysis to cause symptoms the tendency to displacement would be most certainly marked, yet the cases are almost invariably trifling.

The more this view of the matter is analyzed the less tenable it seems to be.

Now with reference to the first mentioned theory, it is to be urged that in the cadaver a condition of affairs can be produced which is objectively identical with that observed in the living. The same manipulations produce the same results in attempts at reduction in both the living and the dead. I am not able to confirm Dr. Van Arsdale's experience as to there being any essential difference in the character of the snap on reduction, or the nature of the resistance on manipulation.

There can be no doubt whatever that in the cadaver this condition of affairs is produced by a dragging out of the head of the radius, especially its anterior portion, from within the annular ligament. The snap occurs during reduction when the ligament slips back into place. In my experiments I demonstrated that two factors were potent in effecting reduction. (1) In the injury as it ordinarily occurs, the outer fibres of the capsular ligament are shortened by torsion during forced supination and drag back the annular ligament into place. (2) In some cases the forcible pressing of the head of the radius against the condyle of the humerus, especially when combined with forced flexion, forces out the wedge-shaped edge of the ligament from between the two bones, like a wet melon seed pressed between the thumb and forefinger. This, of course, would effect reduction only when the anterior edge of the annular ligament was alone interposed. The various deviations from the usual type of this injury can be so completely reproduced and so thoroughly explained, as may be seen by reference to my article in the New York *Medical Journal*, January 15, 1887, p. 63, that to my mind the evidence is conclusive that the symptoms of the injury under discussion as observed in life, are due to the same lesions which produce exactly similar objective phenomena in the cadaver.